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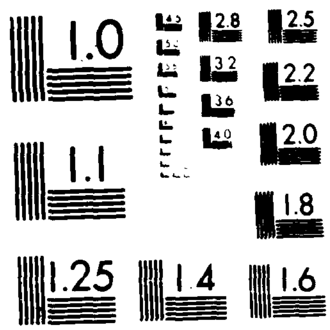

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Heliport Visual Approach Surface Testing Test Plan

Rosanne M. Weiss
John R. Sackett

February 1987

DOT/FAA/CT-TN86/61

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16. Abstract

This Technical Note identifies procedures to be used during tests to be conducted at the Federal Aviation Administration Technical Center. These tests are designed to test the applicability of existing heliport approach and departure surface criteria. Three different types of aircraft will be used.

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EXECUTIVE SUMMARY

The Guidance and Airborne Systems Branch, ACT-140, has received a request from the Office of Airport Standards, AAS-100, to examine and validate the current heliport approach/departure surfaces criteria as defined in the Heliport Design Guide and determine if changes should be made to the current criteria.

Several factors promoted this activity. The current criteria was based on experience tempered with engineering judgement. Industry has challenged this criteria as being too conservative. Little flight data exist which validates the current criteria. With the rapid growth in the helicoper industry and in pubiic acceptance of the helicopter as a mode of transportation, heliport construction, many at confined locations, has increased.

The primary objectives of this program are to provide flight data to verify the current approach/departure surface criteria and determine the airspace required for visual approaches/departures. Three different approach angles, 7.125°, 8°, and 10° and three departure angles, 7.125°, 10°, and 12° will be flown for both straight-in and curved path procedures. The project will consist of at least 330 approaches and departures using 22 subject pilots with each flying at least 15 procedures.

The approach/departures will be tracked using a laser ground-based tracking system. The airborne data acquisition system will record various aircraft performance data. The ground tracker data and airborne data will be merged and analyzed to yield statistics concerning approach/departure course deviation. The tracker data will be used to generate plots depicting both a profile view and a plane view of each procedure relative to the desired course. Pilot evaluations will be analyzed to determine work load, safety factors, and control issues. The observer logs will also be examined to determine other factors that may influence the course deviation such as weather and wind conditions.

1. INTRODUCTION.

1.1 PURPOSE.

This test plan describes Part I of the Helicopter Visual Meteorlogical Conditions (VMC) Clearance project and has the following purposes:

a. Identify problems for investigation and define tasks for their resolution.

b. Develop appropriate test procedures.

c. Describe methods for data collection, reduction, and analysis.

d. Specify required data.

1.2 BACKGROUND.

The focus of this test is on the issue of airspace requirements and obstruction protection requirements for visual approaches and departures at a heliport.

The current Federal Aviation Adminstration (FAA) Heliport Design Guide states:

"The area of the primary surface coincides in size and shape with the designated take-off and landing area of a heliport. It is a horizontal plane at the elevation of the established heliport elevation.

The approach surface begins at each end of the heliport primary surface with the same width as the primary surface, and extends outward and upward for a horizontal distance of 4000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civilian heliports.

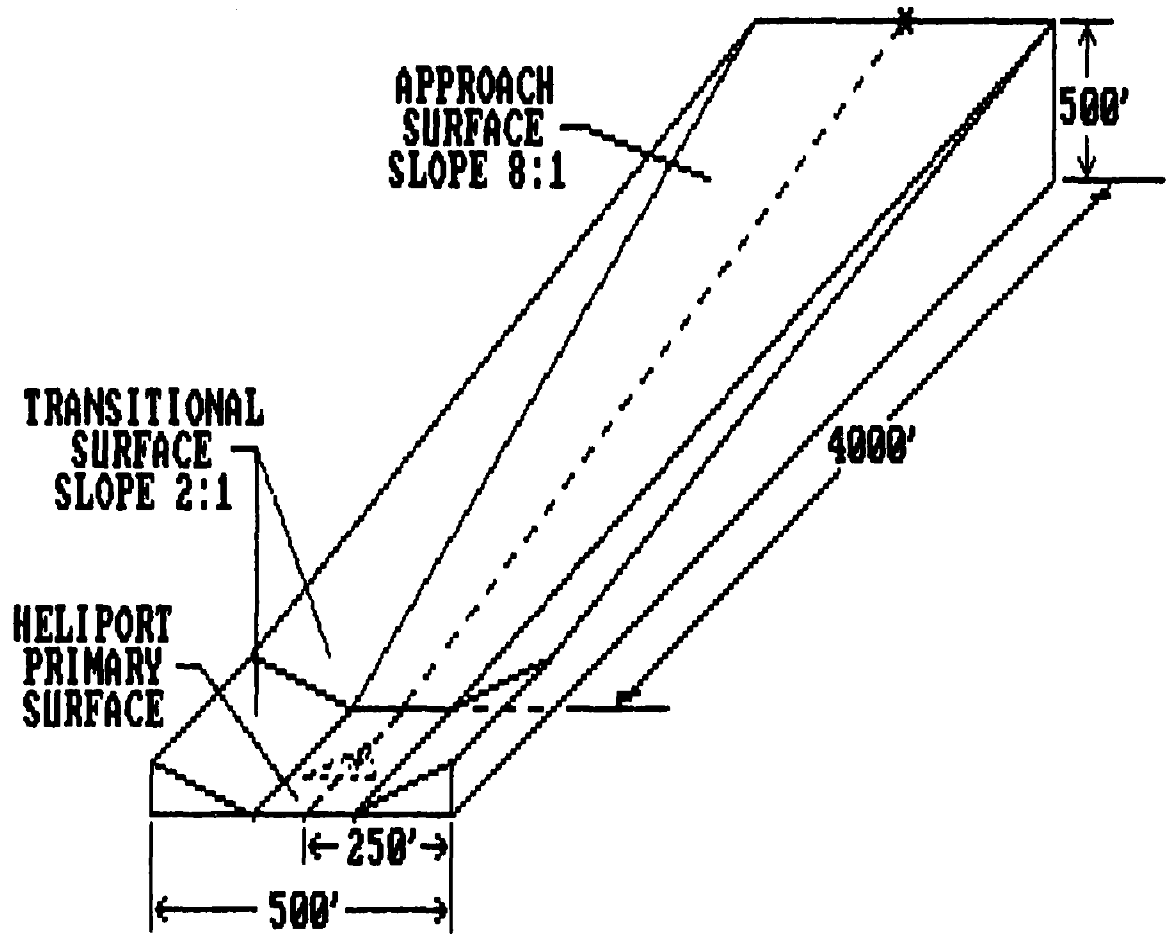
And, the heliport transitional surfaces extend outward and upward from the lateral boundaries of the heliport primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces."

The airspace is pictorially depicted in figure 1.

The criteria for the approach surface has been challenged by industry as being too conservative. The data collected during this test activity will examine pilot performance within this criteria and determine whether changes to the criteria can be supported.

1.3 TEST LOCATION.

The flight test will be conducted at the FAA Technical Center, Atlantic City International Airport, New Jersey. Visual approaches and departures will be conducted at the Center's new Demonstration and Concepts Development Heliport. The flight test aircraft will generally remain within a 2-nautical mile (nmi)



FAR PART 77 VISUAL APPROACH SURFACES

FIGURE 1. APPROACH/DEPARTURE SURFACES

radius of the heliport. The aircraft tracking system, data recording system, and data reduction equipment are located at the Center.

1.4 OBJECTIVES.

The objectives of this project are as follows:

a. Determine the airspace consumed during visual approaches to a heliport.

b. Verify the requirements for the current Heliport Design Guide's visual approach path surfaces or determine possible modifications to these surfaces.

c. Determine the airspace consumed during visual departures.

d. Verify the requirements for the current Heliport Design Guide's visual departure path surfaces or determine possible modifications to these surfaces.

2. FACILITIES AND INSTRUMENTAION.

2.1 TEST AIRCRAFT.

2.1.1 Sikorsky S-76.

The S-76 is a twin turbine engine, single main rotor helicopter designed to carry up to 13 passengers and a pilot. It is capable of speeds up to 155 knots, has a maximum takeoff weight of 10,300 pounds, with a main rotor diameter of 44 feet.

The S-76 utilized in this flight test is equipped with a Sperry Automatic Flight Control System (AFCS) and a HelCIS Flight Director with raw data Microwave Landing System (MLS) information displayed on a Sperry RD650A Horizontal Situation Indicator (HSI). The aircraft is certified for single pilot Instrument Flight Rules (IFR) operations as well as for operations with two pilots. This S-76 is representative of the IFR certified helicopters currently in use.

2.1.2 Bell UH-1H.

The UH-1H is a single turbine engine, single main rotor helicopter designed to carry up to 14 passengers and a pilot. It is capable of speeds up to 120 knots, has a maximum takeoff weight of 9,500 pounds, and the main rotor is 48 feet in diameter. The use of this aircraft has been obtained through an Interagency Agreement with the Department of the Army.

2.1.3 OH-6.

The OH-6 is a single turbine engine, single main rotor helicopter designed to carry up to 3 passengers and a pilot. It is capable of speeds up to 124 knots. The standard maximum gross takeoff weight is 2163 pounds, and the main rotor is 26 feet 4 inches in diameter. The use of this aircraft has been obtained through an Interagency Agreement with the Department of Army.

2.2 GROUND TRACKING.

2.2.1 GTE Sylvania Laser Optical Tracking System.

The laser is the primary precision source for aircraft position data. It has a maximum reliable range of 7 miles with an accuracy of 2 feet in clear visual conditions and can track an aircraft from takeoff through touchdown.

2.2.2 Nike/Hercules Radar.

The Nike/Hercules Radar system contains two X-band radar systems, a Target Tracking Radar (TTR) and a Missile Tracking Radar (MTR), which have been modifed to output digital range, azimuth, and elevation data. Maximum range is 200 nmi with an accuracy of 0.01 milliradian (mrad) in azimuth and elevation and 3 meters in range.

2.2.3 Extended Area Instrumentation Radar (EAIR).

EAIR is a C-band transponder tracking system which records aircraft position in azimuth, elevation, and range from the radar site. Maximum range is 190 nmi in the beacon tracking mode, with an accuracy of 0.2 mrad in azimuth and elevation and route means square (rms) range error or less than 20 yards at 3,000 yard/second range rate.

2.3 AIRBORNE DATA COLLECTION EQUIPMENT.

2.3.1 Sikorsky S-76.

The airborne data collection package is a computer driven, general purpose programmable system. A militarized Norden PDP-11/34M minicomputer controls the data collection through software stored on a floppy disk and hardware contained in an expansion chassis. The computer hardware includes a real-time clock, floating point hardware, 32K x 18 bit MOS memory, floppy-disk interface, and RS232 interfaces for the terminal and cartridge recorder. Various aircraft performance data are recorded on magnetic tape. Among the parameters recorded for this project are time, airspeed, vertical speed, altitude, pitch and roll attitudes, heading, MLS azimuth and elevation, Distance Measuring Equipment (DME) distance, flags, stick position, and three-axis acceleration values. A complete list of airborne parameters recorded is contained in table 1.

TABLE 1. S-76 AIRBORNE DATA COLLECTION PARAMETERS

Parameters	Units	Minimum Sample Rate/Second	Significance Level
Time	Hours/minutes/seconds	N/A	0.001 sec
ADC indicated airspeed	Knots	2	1 kt
ADC vertical velocity	Feet/minute	2	10 ft/min
Aircraft heading	Degrees magnetic	2	0.020 deg
Barometric altitude 29.92	Feet	2	2 ft
Radar altitude	Feet	2	1.2 ft
Vertical deviation Subject pilot HSI	Linear: feet Dots: as scaled on display Angular: degrees	2	0.001 dots
Lateral deviation Subject pilot HSI	Same as vertical above	2	0.001 dots
MLS azimuth	Degrees	2	0.005 deg
MLS elevation	Degrees	2	0.005 deg
Along track distance	Feet	2	1 ft
MLS flags	Discrete code	2	NA
Cyclic position	Percent of full scale	2	0.05 percent
Pedal position	Percent of full scale	2	0.05 percent
Collective position	Percent of full scale	2	0.05 percent
Roll angle	Degrees	2	0.02 deg
Pitch angle	Degrees	2	0.02 deg
Event marker	Discrete code	2	
Normal acceleration	g's	2	0.01 g

Note: ADC = Air Data Computer

2.3.2 Bell UH-1H.

The airborne data collection system on the UH-1H is a 6809-based package which is a combination of an off-the-shelf data package and FAA designed and built interface boards. The system is capable of recording the parameters listed in table 2 for storage on a Kennedy magnetic tape recorder.

2.4 WIND SENSOR EQUIPMENT.

The anemometers to be used for the heliport manuevering tests are Belfort Instrument Company 5-122 HD Wind Vector Transmitters. These transmitters consist of two major elements: (a) an upper section containing a wind speed generator attached to an airplane rudder shaped vane, and (b) a fixed vertical support and connector housing. The wind speed signal generator is housed in a weatherproof housing and is driven by a six-bladed propeller. The transmitter senses both wind speed and direction. It then converts these measurements into two direct current (dc) voltages: one which is proportional to both wind speed and the sine of the wind angle, and the other which is proportional to wind speed and the cosine of the wind angle. These signals will be processed and stored on a personal computer for analysis.

3. PROBLEM/TASKS

3.1 STATEMENT OF THE PROBLEM.

The current FAA criteria for heliport takeoff and landing area approach and departure surfaces are based on experience tempered with engineering judgement. Currently, the approach and departure surfaces allow for a minimum 7.125° approach/departure angle above that surface. Little flight data have been collected that would validate or support changes to the current restrictions placed on those surfaces. Additionally, helicopter turbine powered operations have increased considerably, resulting in nominally higher performance levels in the civil rotorcraft fleet.

Approach paths with angles of 7.125°, 8° and 10° and departure paths with angles of 7.125°, 10°, and 12° will be flown during these tests. The data collected will be reduced and analyzed to determine flightpath performance limits at each of the these angles relative to the exisiting surfaces.

In addition, each pilot will be asked to fly approaches and departures of his own choice. The only restrictions placed on these free choice approach/departures will be that they must meet the height/velocity restrictions for the aircraft. Additionally, free choice approaches must begin at least 500 feet above ground level (AGL).

3.2 TASKS.

The approach/departure protected surface extends outward to 4000 feet. However, pilots routinely initiate turning approaches inside the outer limits of the surface. As a result, both straight-in and curved path procedures will be examined.

TABLE 2. UH-1H AIRBORNE DATA COLLECTION PARAMETERS

Parameters	Units	Minimum Sample Rate/Second	Significance Level
Time	Hours/minutes/seconds	-	0.001 sec
Indicated airspeed	Knots	2	0.0977 kt
Vertical velocity	Feet/minute	2	0.488 ft/min
Aircraft heading	Degrees	2	0.022 deg
Barometric altitude 29.92	Feet	2	1.95 ft
Radar altitude	Feet	2	1.732 ft
MLS azimuth deviation	Microamps	2	0.02 μA
MLS elevation deviation	Microamps	2	0.02 μA
MLS azimuth	Degrees	2	0.005 deg
MLS elevation	Degrees	2	0.005 deg
MLS range (DME/P)	Feet	2	3 ft
All digital MLS flags	-	2	-
All cross pointer flags	-	2	-
Transverse acceleration	g's	2	0.0012 g's
Longitundinal	g's	2	0.0012 g's
Vertical acceleration	g's	2	0.0049 g's
Time code generator time	Milliseconds	-	0.001 sec

3.2.1 Straight-In vs. Curved Path.

a. Approaches: Each straight-in approach will begin at least 6000 feet from the touchdown point. One out of every three approaches will be a curved path approach during which the pilot will maneuver through at least a 90° turn prior to arriving on the final approach segment. The profile will be designed so the turn to final is completed at least 200 feet AGL (see figure 2). The pilot will be asked to begin the free choice approach no earlier than 0.7 nmi from the intended touchdown point, from an altitude of at least 500 feet.

b. Departures: The AWOS wind sensor will be used as a departure obstacle which controls the angle of the departure surface. Departure points will be offset from the center of the landing/departure area towards the wind sensor. Ground track will be maintained on straight-out departures until the helicopter reaches 500 feet. One out of every three departures will be a curved path departure. During curved path departures the turn will not commence until the airspeed indicator is reliable as defined in the Aircraft Operator's Manual (AOM) (i.e., 30 knots indicated airspeed (KIAS) for the S-76, and 25 KIAS for the UH-1). The departure point for free choice departures will be determined solely by the pilot.

3.2.2 Length of Approach/Departure Surfaces.

The approach/departure surfaces horizontal distance (4000 feet) has been criticized as being too conservative. It is anticipated that with a steeper approach/departure angle the slope of the surface can be increased, resulting in an overall decrease in the horizontal distance. Additionally, the distance at which subject pilots initate approaches will be used to determine if the length of the surface requires modification.

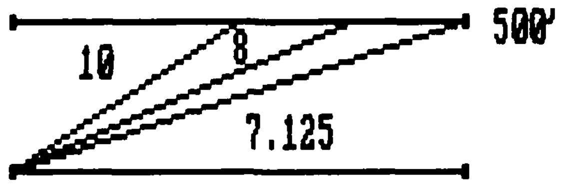
4. TESTING AND DATA COLLECTION.

4.1 SUBJECT PILOT SELECTION.

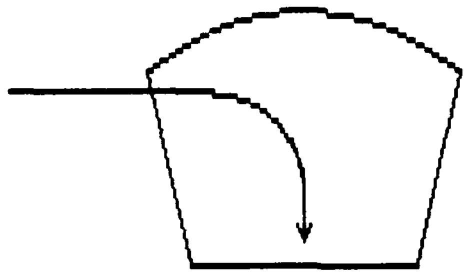
Six subject pilots for the S-76 will come from the FAA Technical Center and four from private industry. At least six subject pilots for the OH-6 will be available through an Interagency Agreement with the New Jersey Army National Guard. UH-1 pilots will come from the FAA Technical Center as well as from the Avionics Research and Experimental Activities Center, Ft. Monmouth, N.J. A diverse range of experience is desired so the conclusions will be based on average helicopter piloting skills.

4.2 DATA COLLECTION FLIGHTS.

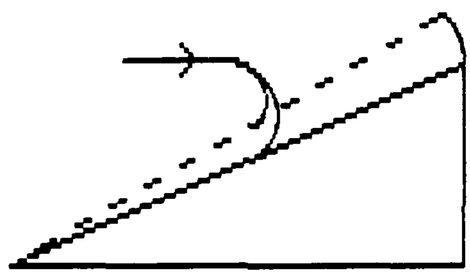
Each subject pilot will fly 15 approaches and departures. A single run will consist of one approach and one departure. Three given approach angles, 7.125°, 8°, and 10°, and three given departure angles, 7.125°, 10°, and 12° will be flown (see table 3). Pilot choice approach and departure angles will also be flown.



2a. STRAIGHT IN



2b. PLAN VIEW



2c. PROFILE

FIGURE 2. PLAN VIEW AND PROFILE VIEW OF APPROACHES

TABLE 3. FLIGHT PROFILES

Run Numbers	Departure Angle	Approach Angle
1	Free choice	Free choice curved path
2	Free choice curved path	Free choice
3	Free choice	Free choice
4	7.125° Curved path	7.125°
5	10°	7.125°
6	12°	7.125°
7	7.125°	8°
8	10° Curved path	8°
9	12°	8° Curved path
10	7.125°	10°
11	10°	10°
12	12° Curved path	12° Curved path
13	Free choice	Free choice
14	Free choice curved path	Free choice
15	Free choice	Free choice curved path

The 7.125° angles will set up an approach or departure that parallels the current approach/departure surface requirements. Runs at this angle will allow for measurement of pilot performance in reference to the current standard. The position from which to begin each departure will yield an angle that will clear barriers that control the departure surface angle.

Each departure angle will be paired with a different approach angle, thus each approach/departure angle will be flown three times during a flight. To determine pilot preference, each pilot will also be allowed to fly six approaches and departures of choice. Three of the free choice procedures will occur prior to the assigned angles and three will follow completion of the runs with the given angles. An entire flight should be completed in a 2-hour time period. Ideally, each pilot will conduct two flights in one day (see table 4).

TABLE 4. DAILY SCHEDULE

0930 - 1000	Preflight briefing
1000 - 1200	15 Test approaches/departures
1200 - 1300	Refuel/lunch
1300 - 1500	Second flight - 15 approaches/departures
1500 - 1530	Postflight debriefing

The pilot will be given very high frequency omni-directional radio range (VOR)/DME navigational guidance or "air traffic control (ATC) vectoring" to position the aircraft to the approach starting point for fixed angle approaches. From that point the visual segment will be unguided. Each approach will begin from an altitude of at least 500 feet.

Each aircraft will be flown as close to maximum gross weight as possible. An effort will be made to keep the weights for each within the following ranges: for the S-76, between 9,000 to 10,000 pounds; for the UH-1, between 8,000 to 9,000 pounds; and for the OH-6, 2,000 to 2,150 pounds.

4.3 DATA RECORDING AND COLLECTION.

Data will be collected to determine the precision with which pilots are able to control the position and flightpath of the helicopter relative to a criterion surface during the visual approach or departure. This requires:

a. An accurate determination of the helicopter position relative to the landing site.

b. Measurement of pilot performance.

c. Knowledge of the intended flightpath during the approach/departure.

Additional data will be taken to establish objective measures of pilot workload, control margin, and perceived safety for each procedure. These measures and aircraft position will be determined from the following sources:

a. Ground-based position tracking system.

b. Airborne data collection systems.

c. In-flight pilot ratings/questionnaires.

d. Post-flight pilot ratings/questionnaires (see appendix, page A-2)

e. Observer log/comments (see appendix, page A-1).

4.3.1 Preflight Briefing.

During the preflight briefing the subject pilot will be presented with an overview of the objectives of the flight test, an outline of the runs to be flown, and the in-flight questionnaire will be explained. Each pilot will be briefed on the rating system criteria. The rating system is depicted in figure 3. Free choice approach/departure limitations and duties of each crew member will also be explained.

4.3.2 Tracking.

Tracking of the aircraft flightpath will be from beyond the approach initiation point through touchdown and from departure to at least 500 feet AGL.

4.3.3 In-flight Pilot Rating.

The pilot will be asked a maximum of five questions following each approach and each departure concerning procedures, workload, and safety margin. Pilot responses will be recorded in a written log by the flight observer or technician.

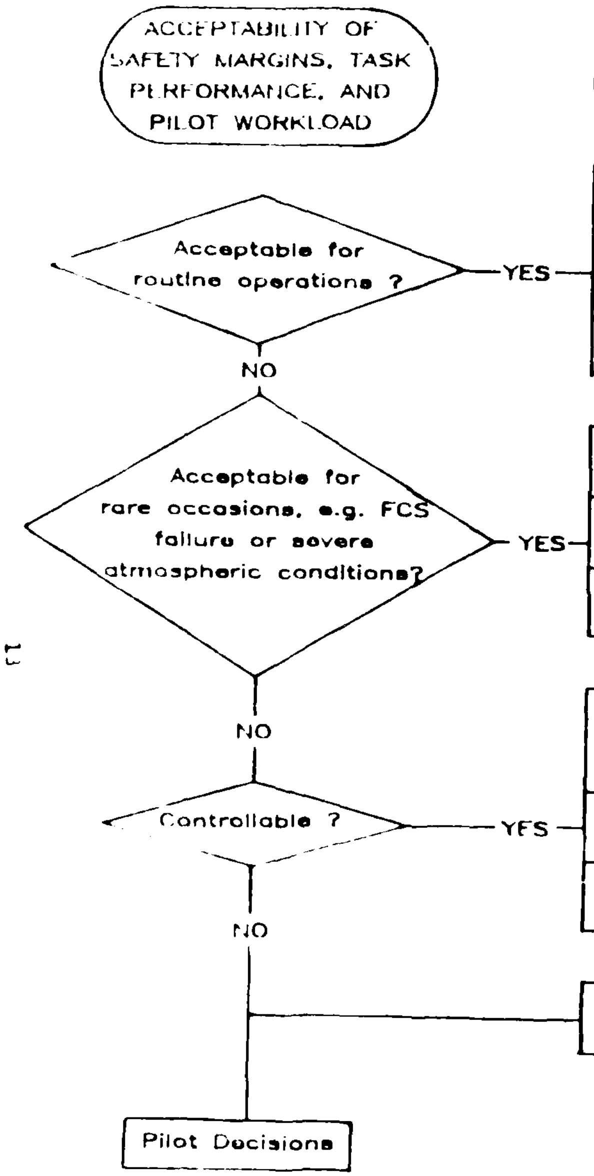
4.3.4 Post-Flight Questionnaire.

At the conclusion of each flight the subject pilot will complete a questionnaire (see appendix, A-2). This questionnaire will ask for pilot opinion about issues such as suitability of the approach/departures, difficulty in maintaining control, personal preference, and workload. Pilot background information will also be collected such as number of flight hours and aircraft experience. This information will be correlated with performance.

4.3.5 Observer Responsibilities.

The flight observer, usually the project technician, will be responsible for filling in the observer log during each flight. Start and stop times of each approach/departure, pilot name, and date of each flight will be recorded. Pilot comments, event marks, notes about equipment problems, and local weather

MODIFIED COOPER—HARPER RATING SCALE



GENERAL CHARACTERISTICS	SAFETY MARGINS	DEMANDS ON THE PILOT	PILOT RATING
Excellent Highly Desirable	Clearly adequate	Pilot compensation not a factor for desired performance	1
Good Negligible Deficiencies	Clearly adequate	Pilot compensation not a factor for desired performance	2
Fair -- Some Mildly Unpleasant Deficiencies	Clearly adequate	Minimal pilot compensation required for desired performance	3
Minor but annoying deficiencies	Clearly adequate	Desired performance requires moderate pilot compensation	4
Moderately objectionable deficiencies	Adequate	Adequate performance requires considerable pilot compension	5
Very objectionable but tolerable deficiencies	Marginal	Adequate performance requires extensive pilot compension	6
Major deficiencies	Inadequate	Adequate performance not attainable with maximum tolerable pilot compensation Controllability not in question	7
Major deficiencies	Inadequate	Considerable pilot compensation is required for control	8
Major deficiencies	Inadequate	Intense pilot compensation is required to retain control	9
Major deficiencies	None	Control will be lost during some portion of required operation	10

FIGURE 3. COOPER-HARPER RATING SCALE

and wind conditions will also be recorded. For the OH-6 flights, the safety pilot will also function as the flight technician.

4.3.6 Flight Systems Data.

The following airborne parameters, to be recorded on the S-76 and the UH-1, will be reduced for analysis:

Airspeed	DME/P
Vertical velocity	Aircraft heading
Barometric altitude	Cyclic position
Radar altimeter	Collective position
Azimuth	Roll
Elevation	Pitch

4.3.7 Wind Information.

Ten wind sensors will be placed at various locations around the heliport to collect wind and rotor effect information. This information will be examined to determine the effect of the approaches and departures and will be used to establish a baseline for future heliport maneuvering tests.

5. DATA REDUCTION AND ANALYSIS.

5.1 DATA TAPES.

All magnetic tapes obtained from the airborne data system will be time merged with the tapes from the ground tracker system. These data will be converted to engineering units. All merged data shall be examined and validated before final processing to assure the correct parameters were recorded and that the data are valid. Outliers will be removed and the data will be smoothed. Linear interpolation will be used to correct any discontinuties in the airborne and tracker data. The output will be at a rate of one sample per second.

5.2 DATA PROCESSING.

Data shall be translated using a rectangular coordinate reference system which will be established with the origin at the center of the heliport. The X and Y axis will run through the centerline with the X-axis positive on the approach side and negative beyond the origin. The Y-axis will be perpendicular to the X-axis within the heliport plane, positive to the right of the X-axis and negative to the left. The Z-axis is drawn perpendicular to the X-Y plane at the ground point of intercept (GPI), positive above and negative below the heliport plane (figure 4).

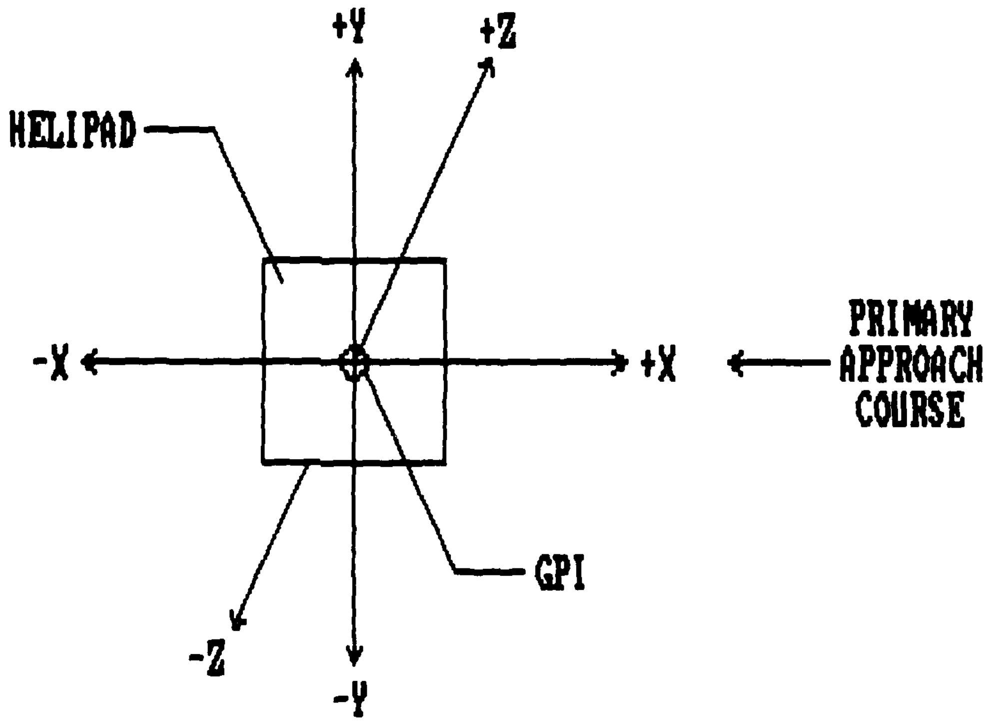


FIGURE 4. RECTANGULAR COORDINATE REFERENCE SYSTEM

The position of the aircraft in space as determined by the ground tracking system will be translated and rotated with respect to this rectangular coordinate system to within 5 feet. This processing will be performed on the VAX 11/750 minicomputer.

5.3 GRAPHICAL PRESENTATION.

5.3.1 Plots.

The following individual and composite plots will be generated on a Calcomp 1051 drum plotter using Calcomp 907 software for the VAX 11/750:

a. Plan view of each approach/departure with intended path and criterion surface shown.

b. Profile view of each approach/departure with intended path and criterion surface shown.

c. Composite plots: vertical and crosstrack by range for each profile, with intended path and criterion surface shown.

d. Plots of pitch, heading, airspeed, and control position for each individual approach/departure.

e. Probability contours, mean ± 2, ± 6 standard deviations by range for each profile:

1. About the vertical track deviation.
2. About the crosstrack deviation.

f. Vertical and lateral aircraft position for each approach/departure broken down into 100-foot segments.

g. Scatter plots of landing dispersion with respect to the planned touchdown point and perpendicular through the GPI.

5.3.2 Data Partitioning.

Each approach/departure will be partioned into 100-foot intervals by distance from the center of the helipad. Given an approach initiation point and a departure initiation point, linear interpolation will be used to calulate the 100-foot intervals. For approaches this partitioning will begin at the center of the helipad and continue out to the approach initiation point. For departures it will begin at the departure point and continue up to 500 feet AGL.

5.4 STATISTICAL ANALYSIS.

Reference will be made to the computation of standard statistics throughout this section. The following is a list of the parameters to be computed for Course Deviation Indicator (CDI), Vertical Deviation Indicator (VDI), elevation

angle, vertical track deviation, crosstrack deviation, vertical track position, and crosstrack position:

Parameter	Notation
Number of data points	N
Aritmetric Mean	X
Maximum value	X_{max}
Minimum value	X_{min}
Unbiased estimate of variance	Su^2
Biased estimate of variance	Sb^2
Unbiased estimate of standard deviation	Su
Biased estimate of standard deviation	Sb
Skewness	b_1
Kurtosis	b_2

5.4.1 Obstacle Clearance Analysis.

This analysis will be used to verify the current heliport design guide approach/departure surface criteria or to support modifications to the criteria. Standard statistics at each of the partitions specified in section 5.3.2 for each approach/departure type will be computed for:

a. Vertical deviation (deviation from the intended vertical path).

b. Crosstrack deviation (deviation from intended horizontal path).

c. Vertical position (pilot's actual vertical path).

d. Crosstrack position (pilot's actual crosstrack path).

e. Variability in approach initiation point, anglewise, and distance for free approaches.

5.5 REPORTS.

The data will be analyzed and a final report will be written by Technical Center personnel. This report will contain all statistical data obtained from the test flights as well as pilot evaluations of each approach/departure type. The report will address the objectives of this test.

6. SCHEDULE.

Figure 5 describes the projected amount of time each phase of this project will need for completion. The following factors may have an impact on this schedule:

a. Availability of the ground based tracker.
b. Weather.
c. Accessibility of the computer facility for data reduction.
d. Aircraft availability.
e. Subject pilot availability.

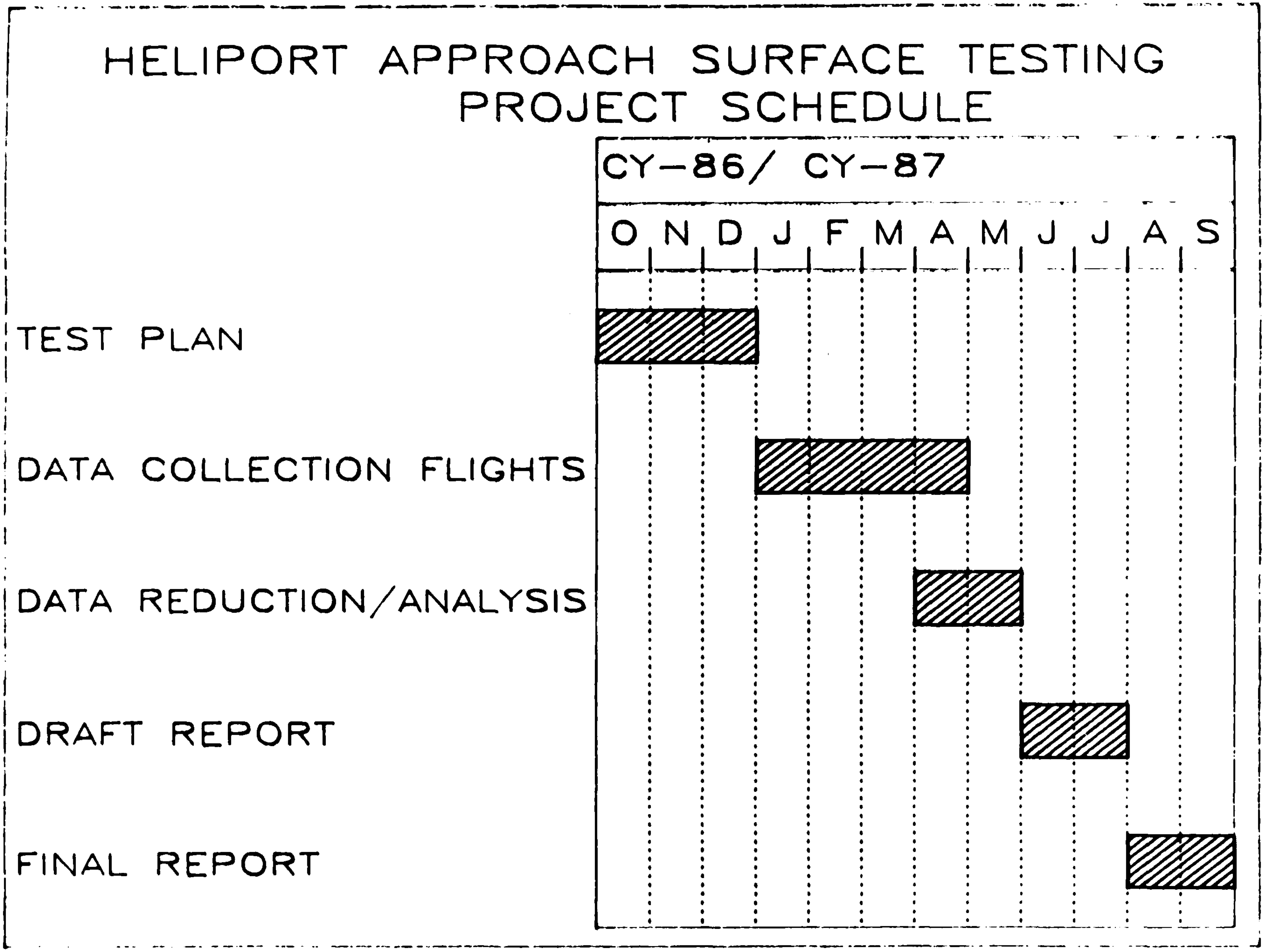


FIGURE 5. PROJECT SCHEDULE

APPENDIX

VMC APPROACHES AND DEPARTURES

Flt #: .AIR	Date:	Aircraft:	LASER[ ] EAIR[ ] NIKE[ ]
Subject Pilot:	Safety Pilot:	Crew:	
Pitot/Static lines open	Control box - fast	Synch clock - radio & tracker	
[1] Liftoff	[2] Start curve	[3] End curve	[4] Touchdown

[5] [illegible]

RUN #	TK #	WINDS & BARO	EVENTS	RATE	REMARKS

1. How do you rate the approach [illegible]

[illegible]

HELICOPTER VISUAL METEOROLOGICAL CONDITIONS (VMC
SURFACE TEST QUESTIONNAIRE

AIRCRAFT TYPE: ____________________

OPERATIONAL PILOT QUALIFICATIONS

NAME: ____________________

AFFILIATION: ____________________

ADDRESS: ____________________

CITY: ____________________ STATE: __________ ZIP: __________

PHONE (optional) ____________________

FAA HELICOPTER RATINGS: (Private, Comm, ATP, Helicopter Inst)

____

____

____

____

TOTAL FLIGHT HOURS: ____________________

TOTAL HELICOPTER HOURS: ____________________

TOTAL TIME IN TYPE: ____________________

TOTAL HELICOPTER HOURS LAST 6 MONTHS: ____________________

TIME IN TYPE LAST 6 MONTHS: ____________________

PERIOD OF FAA FLIGHT TEST: (week of) ____________________

QUESTIONS

1. a. The 7° approach angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 7° approach angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		[illegible]

c. With a 7° approach angle the workload was:

1	2	3	4	5
Increased		Normal		[illegible]

d. With a 7° approach angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		[illegible]

2. a. The 8° approach angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 8° approach angle the safety margin was:

1	2	3	4	
Inadequate		Marginal		

c. With a 8° approach angle the workload was:

1	2	3	4	
Increased		Normal		

d. With a 8° approach angle the control margin was:

1	2	3	4	
Inadequate		Marginal		

3. a. The 10° approach angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 10° approach angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 10° approach angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 10° approach angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

4. a. The 7° departure angle was:

_____ Acceptable _____ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 7° departure angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 7° departure angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 7° departure angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

5. a. The 10° departure angle was:

______ Acceptable ______ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 10° departure angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 10° departure angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 10° departure angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

6. a. The 12° departure angle was:

______ Acceptable ______ Unacceptable

If unacceptable why? ____

____

____

____

____

CONTINUE ON BACK

b. With a 12° departure angle the safety margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

c. With a 12° departure angle the workload was:

1	2	3	4	5
Increased		Normal		Decreased

d. With a 12° departure angle the control margin was:

1	2	3	4	5
Inadequate		Marginal		Adequate

7. What percentage of your routine operations are conducted into and out of heliports or helistops? ______________________________

8. Do you feel the turning approach/departure maneuver should have an appropriate surface published in a design guide?

______ YES ______ NO

WHY? ______________________________

____

____

____

____

CONTINUE ON BACK

9. Do you feel heliports should be delineated by capability?

______ YES ______ NO

If yes should it classed by:

Heliport size	______ YES	______ NO
Rotor Configuration (single vs dual)	______ YES	______ NO
Aircraft Max Gross Weight	______ YES	______ NO

Other ______________________________

____

CONTINUE ON BACK

10. What improvements would you like to see added to a heliport to increase safety while performing approaches/departures (i.e. visual approach slope indicator)?

____

____

____

____

____

____

CONTINUE ON BACK

11. Should the approach surface ratio be published for the primary approach into a facility ?

______ YES ______ NO

If yes how would you like it to be indicated? ______________________________

____

END
5-87
DTIC